

**WASTE CHARACTERISTICS
SITE SANITARY LANDFILL
OU-1 – MOUND DOE FACILITY
April 3, 2006**

By Miamisburg Mound Community Improvement Corporation (MMCIC)

Introduction

In response to community concerns, Congress has appropriated \$30M to further remediate an area of the DOE Mound site known as Operable Unit 1 or OU-1. This area is comprised of three distinct parts. These parts include the 1) "Site Sanitary Landfill," 2) "Historic Waste Disposal Area" and 3) "Overflow Pond" (a detention basin). Additional remedial activities, based upon exhumation, will be carried out over the next year to properly dispose of wastes from OU-1.

The purpose of this paper is to provide a consolidated history of the waste within the Site Sanitary Landfill to establish a confidence level about its makeup. The history will serve as a basis for developing sampling requirements to determine if the wastes can be disposed of within a licensed Subtitle D facility. A concern exists with the regulatory organizations responsible for approving the disposal of this waste. The concern involves the uncertainty that Historic Waste Disposal Area materials, including radioactive wastes, have been mixed with the Site Sanitary Landfill wastes. This concern is based on the proximity of the Site Sanitary Landfill to the Historic Waste Disposal Area (where the radioactive materials are known to exist), and uncertainties stemming from information contained within a documented history of the area. This paper attempts to 1) consolidate the written history of the Site Sanitary Landfill, sampling data, analysis of aerial photography and environmental investigations conducted on the material, 2) provide information concerning the organizational and regulatory influences on the waste, and 3) identify and discuss certain uncertainties and concerns expressed about the Site Sanitary Landfill waste.

Developing a clear understanding of the uncertainties, and developing the sampling plan necessary to address the uncertainties is critical to increasing the opportunity to remove additional waste. The importance of this is illustrated by the two to three hundred percent increase in cost to dispose of the Site Sanitary Landfill wastes as low-level and radioactive versus sanitary waste. The disposal of the material as sanitary waste may permit funds to be redirected to the removal of other OU-1 wastes considered more hazardous.

Discussion

OU-1 Site Location and General Disposal History – OU-1 is located in the west-central portion of the DOE Mound facility, and partially over the "Buried Valley Aquifer System," a sole source aquifer designated by the USEPA. (See Figure 1) The area is bound by Mound site access roads on the north, south and west sides, which are visible in aerial photographs dating back to 1948. The eastern side is controlled by severe topographic change and bedrock. Today, an Overflow Pond or detention basin occupies the northern half of the OU-1 area. The southern half of the area is comprised of the Site Sanitary Landfill, while the Historic Waste Disposal Area resides beneath the western half of the Site Sanitary Landfill and the southwestern corner of the Overflow Pond.

The primary documentation for the disposal of wastes within OU-1 is a summary history report, titled "*Area B, Operable Unit 1, DOE Mound Plant, History of Area B,*" prepared for the DOE Albuquerque Operations Office, February 1991. The Area B referenced in the title of the report corresponds to the Overflow Pond, Site Sanitary Landfill and the Historic Waste Disposal Area. This history was reconstructed from interviews of long-term employees; site documents and photos, and from environmental investigations carried out in the 1980's. As part of planning for the additional remediation of OU-1, additional historical research has been carried out, using air photo analysis and a review of environmental investigations carried out since 1990.

OU-1 has been the site of waste disposal from near the time that the Mound Facility first began operations in 1948 and continued until 1976. The character of wastes disposed of in these areas changed with time, based on the types of wastes generated at the Mound facility, and also in response to both State and Federal waste disposal rules. The large majority of wastes disposed of within OU-1 consists of sanitary wastes, including office paper, food wastes and ordinary trash. For a period of time, hazardous materials were disposed of within OU-1. There were also specific events when radioactive wastes were disposed of within limited portions of the Historic Waste Disposal Area. Over time, wastes generated at the Mound facility have also been disposed of in three different, but overlapping locations within OU-1. It is reasonable to assume that the character of the wastes disposed of in different portions of OU-1 may be very different, based on both the changes in the waste stream with time, and on the different locations where wastes were disposed of. A description of the three waste disposal areas and their associated time frames are provided below.

- **The Historic Waste Disposal Area (1948-1969)** – This disposal area, shown in Figure 2, is located in the southwestern corner of OU-1, beneath the western end of the Site Sanitary Landfill and the southwestern corner of the Overflow Pond. The Historic Waste Disposal Area was originally a borrow pit, excavated during construction of the Mound facility in the mid 1940's. It was used as a disposal site for most or all of the wastes from the plant from 1948 until 1969. From 1948 until 1954 only limited portions of the Mound facility were operational, and only biological research and urinalysis was being conducted in the active portions of the facility. As a consequence, wastes generated during this time period would have consisted of sanitary wastes, biological materials and discarded urinalysis specimens.

Starting in 1954, more portions of the Mound facility became operational, and a wider variety of industrial processes were carried out. The bulk of the wastes generated during this time period would have included the same laboratory, office and kitchen wastes. Other wastes disposed of in the Historic Waste Disposal Area included evacuated gas cylinders, hazardous metals (including beryllium and mercury), plating wastes, photo-processing chemicals, PCB-containing oils, and a number of liquid hazardous wastes, including chlorinated solvents (carbon tetrachloride, tetrachloroethene and trichloroethene) and non-chlorinated solvents (acetone, benzene, toluene, alcohols). The solvents were disposed of in part by burning in a mobile "burn cage" and in part by pouring them on the ground. Migration of the chlorinated solvents downward into the aquifer and then down gradient to the former water supply wells triggered the placement of the Mound facility on the National Priority List (Superfund).

Radioactive wastes generated in the ordinary course of activities at the Mound were not routinely disposed of in the Historic Waste Disposal Area, but on three occasions, radioactive materials were deliberately placed within the landfill. These incidents are provided below.

- In 1954, the Dayton Unit wastes were disposed of within a burial trench at the southern limit of the Historic Waste Disposal Area. Prior to the start of operations at Mound, several buildings in Dayton (the Dayton Unit) were used for polonium research, as part of the Manhattan Project. These buildings became contaminated, and were demolished. The building debris was stored on the Mound facility. After the debris caught fire, it was disposed of within the Historic Waste Disposal Area. Potential radioactive contaminants include polonium-210 and lead-210.
- In 1955 approximately 2,500 crushed drums contaminated with thorium were disposed of in a depression atop the Dayton Unit trench. The Mound OU-1 Project Team considers the material in this area the primary target for exhumation as supported by the \$30M Congressional funding.
- In 1965 polonium-210 contaminated sands were disposed of in the same area. (Due to the short half-life of polonium, any radioactivity present within these wastes would have decayed to stable lead by this time.)
- **Burial trenches (1971-1976)** – In response to the Ohio Environmental Protection Agency prohibition on open burning in 1969, under the “Clean Air Act”, waste disposal practices changed. Hazardous liquids that had formerly been disposed of in the Historic Waste Disposal Area were instead collected for off-site disposal. Four burial trenches were cut into clean, low-permeability soils in the hillside to the east of the Historic Waste Disposal Area (Figure 2). Three of these trenches were partially or completely filled between 1971 and 1976. The “*History of Area B*” report indicates that sanitary wastes were disposed of within these trenches, while all radioactive wastes and liquid wastes were segregated and disposed off the Mound property.
- **Site Sanitary Landfill (1977)** – As a result of a spill of plutonium that migrated off site, DOE developed plans for the construction of an Overflow Pond (detention basin) on the northern portion of OU-1. The size and location of the pond encroached upon the sanitary wastes stored within the northern most burial trench requiring it to be removed and relocated. The Site Sanitary Landfill was designed and constructed to accommodate the wastes in the burial trenches. The Site Sanitary Landfill was constructed on top of portions of the Historic Waste Disposal Area, the former site of the burial trenches, and on virgin soils (See Figure 2). The landfill was not built to meet federal and Ohio design and safety standards for solid waste landfills, as it does not have a properly engineered cap and liner, or an effective means of collecting landfill gas and leachate.

The Site Sanitary Landfill area is of least concern to the OU-1 Remediation Project Team as it is assumed to contain only sanitary waste. However, it must be removed in order to gain access to the material of concern in the Historic Waste Disposal Area.

Site Sanitary Landfill Waste Disposal History - According to the “*History of Area B*” report, Ohio Environmental Protection Agency issued a ban on open dumping within Ohio in 1969. In response, the Mound Plant ended the open dumping of both solid and liquid wastes within the Historic Waste

Disposal Area. Liquid wastes (including solvents) were collected and disposed of off-site. Solid wastes were disposed of in three of four trenches, cut by bulldozer into the virgin soils on the hillside located to the east of the historical dump. These four trenches are visible in a 1973 aerial photograph of the OU-1 area (Figure 3), and the locations have been transferred to the site map included as Figure 2. The "History of Area B" report states that the southernmost of the four trenches was never used for waste disposal. Blueprints, maps and cross sections prepared for construction of the Site Sanitary Landfill actually show that only the northern two trenches were filled with trash. Only a thin layer of trash was present in the third trench, and the fourth trench was shown as empty on these documents.

In the mid to late 1970's, an Overflow Pond was installed within the northern portion of OU-1. This pond was designed to temporarily store storm flows and allow sediment to settle prior to release of the flow into the permitted outfall. The location of the facility storm water drainage system dictated the volume and location of the Overflow Pond. In order to install the pond at this location, a considerable volume of clean soil from beyond the limits of the Historic Waste Disposal Area needed to be excavated, as well as the debris from the filled or partially filled sanitary waste trenches. The site was surveyed in 1976 and plans for constructing a new site Overflow Pond were prepared. These plans also called for the exhumation of wastes and underlying soil from the northern three sanitary waste disposal trenches, and backfilling of the excavated area with clean fill necessary to support the construction of the Site Sanitary Landfill. According to the design specifications, the volume of material to be excavated from the waste trenches balances the volume to be disposed of within the Site Sanitary Landfill cell.

An excerpt from the History of Area B document, page 14, provided bid specifications for the excavation, which lists two types of waste:

"The trash to be excavated was defined in the Bid Invitation Specification Document (DOE 1977) as "normally non-nuclear contaminated refuse from laboratory (Mound was known as a Laboratory until the 1980's) operations." The trash was described as consisting of two types: the first type was "unburned materials consisting of plastic bags containing paper, plastic, glass, cloth, other unknown office and laboratory trash, food scraps from the cafeteria, and plastic sample vials containing urine;" the second type of trash to be excavated was described as "burnt materials consisting of residues of metal scraps, tin cans, heavy plastic, wood, wire, short lengths of pipe, smashed drums, sheet metal and laboratory trash" in well-defined layers."

Plans and specifications show that the berm, liner, cap and cover for the landfill were constructed from approximately 60,000 cubic yards of clean soil excavated from the Overflow Pond site, while the landfill cell consisted of approximately 17,000 cubic yards of waste and associated soils from the three sanitary waste disposal trenches, and a limited area beneath what is now the southwestern corner of the Overflow Pond. No wastes from the rest of the Historic Waste Disposal Area were to be excavated as part of this construction process. This can be confirmed from the design plans for the Site Sanitary Landfill, as the volume of waste materials placed in the landfill closely matches the volume of soil and wastes removed from the sanitary waste disposal trench area. If additional wastes from within the Historic Waste Disposal Area had been incorporated into the Site Sanitary Landfill, the landfill would have had to be much larger. During the construction of the Site Sanitary Landfill monitoring was conducted, to ensure that radioactive waste above the plutonium-238 screening level of 100 pCi/g was not disposed of within the new Site Sanitary Landfill.

Potential Concerns

While in the process of evaluating the history of the OU-1 area, the Project Team raised several possible concerns about the Site Sanitary Landfill, which create uncertainties about the waste. These concerns are addressed below in the form of questions and responses.

1. Were any VOC's disposed of within the sanitary landfill?

Response: Volatile organic compounds, including both chlorinated and non-chlorinated solvents, were disposed of within the Historic Waste Disposal Area between about 1954 and 1969. The locations where elevated concentrations of these solvents are present have partially been determined from subsequent investigations. The proposed remedial activities will address these areas of VOC contamination.

As part of the response to the OEPA ban on open dumping in 1969, disposal of liquid wastes within OU-1 ceased. Liquid wastes were instead collected and disposed of off-property. Therefore, disposal of liquid wastes in OU-1 ceased before any wastes were placed in the disposal trenches, or moved into the Site Sanitary Landfill.

As part of the 2004 Savannah River National Laboratories study of ground water beneath OU-1, two soil gas samples from within the cocooned waste within the Site Sanitary Landfill were collected, and analyzed for gases (carbon dioxide, oxygen and methane, as well as volatile organic compounds). Elevated levels of methane and carbon dioxide were present, as would be expected from within a sanitary waste landfill, but only trace levels of chlorinated solvents were present (0.0027 PPMV of tetrachloroethene and non-detect concentrations of trichloroethene in one sample, 0.0024 PPMV of tetrachloroethene and 0.0025 PPMV of trichloroethene in a second sample). These estimated detections are just slightly over the method detection limits, well below the practical quantification limits and several orders of magnitude below the values for soil gas samples from other samples collected from marginal areas of the Historic Waste Disposal Area.

The Savannah River National Laboratories' study concluded that significant amounts of volatile organic compounds were not disposed of within the burial trenches or the Site Sanitary Landfill, and that this "cocooned waste" was not the source of the VOC contamination in the aquifer.

Soil samples were collected from the test borings in which the air sparge wells were installed. These wells were completed through the berm surrounding the Site Sanitary Landfill, and not through the wastes themselves. No volatile organic compounds were detected in over half of the samples collected. Only trace levels were found in the other samples. Average concentrations were at 10 parts per billion of total detected VOCs, and the maximum concentration found was less than 30 parts per billion.

2. Could historic wastes have migrated into the sanitary landfill?

Response: The "History of Area B," page 14, provides the following:

"Solid waste was dumped in the middle of Area B and moved by bulldozer to the trenches, where it was compressed and covered by a few inches of soil cover. Solid waste was rarely dumped directly into the trenches because of the muddy conditions in the area. The solid waste typically consisted of plastic bags containing paper, plastic, glass, cloth, other unknown office and laboratory trash, food scraps from the cafeteria, and plastic sample vials containing urine and liquid scintillation 'cocktails'. About 4 feet of soil cover was placed over the filled trenches to complete the landfill cells."

The "middle of Area B" provided above would have been an area within the Historic Waste Disposal Area, near the open mouths of the trenches. This location would have permitted the wastes to easily be pushed into the trenches. This practice may have created a situation where limited amounts of the underlying soil could have been dragged into the trenches. There is insufficient characterization data on the area to the immediate west of the three burial trenches that were filled or partially filled. However, the available characterization data for the area to the west of the southernmost trench shows that it is very unlikely that either radioactive waste or hazardous waste would have been dragged with the disposed wastes into the burial trenches. This southernmost trench is located closest to the areas where radioactive and hazardous wastes were known to have been disposed of in the Historical Waste Disposal Area, and is therefore the area from which these wastes would most likely have been dragged into the burial trenches. Gamma logging of air-sparge wells show that the sediments that contain radioactive contaminants in the western half of the Historic Waste Disposal Area near this trench were covered by about five feet of non-radioactive soils and wastes. Farther to the east, in the area immediately adjacent to the mouth of the burial trench, no radioactivity above natural background levels was detected by gamma logging of the historic waste disposal materials. Therefore, incidental dragging of surface soils would not have carried radioactive materials into the burial trenches. VOC samples were also collected from both the berm and historic waste disposal sediments when the air sparge wells were installed. All samples collected from the areas up to 100 feet west of the mouth of the southernmost burial trench contained only trivial amounts of VOC s, well below concentrations that would either cause ground-water contamination, or that would be considered hazardous. Therefore, incidental dragging of surface soils would not have carried hazardous materials into the burial trenches.

Plans for the Site Sanitary Landfill indicate that the material within the Historic Waste Disposal Area was not to be removed. Instead, the berm surrounding the Site Sanitary Landfill cell was placed directly on top of the Historic Waste Disposal Area, and the solid wastes from the burial trenches were to be placed within the cell. The boundary between the berm soils and the underlying historical landfill wastes is easily distinguished in DOE test boring logs for wells installed as part of investigation and remediation efforts and from the associated soil analytical sampling data. Analysis of this data confirms that the boundary between the historical landfill wastes and the overlying clean berm soils is between 705 and 710 feet above sea level, consistent with the plans and maps for the construction of the Site Sanitary Landfill, confirming that the wastes from within the 1948 to 1969 Historic Waste Disposal Area were not transferred into the Site Sanitary Landfill.

3. Could radioactive wastes have migrated into the sanitary landfill cell?

Response: Low-level radioactive materials generated during the course of research and manufacturing activities were routinely segregated from the non-radioactive wastes for disposal off of the Mound

property. The date when this segregation policy began is not known for certain, but it began before late 1958 or early 1959, as documented by an accidental disposal incident discussed in more detail below. Given that the waste placed in the sanitary waste cell was originally generated between 1971 and 1976 (long after the waste segregation became a routine policy), radioactive materials above screening levels established at the time would not have knowingly been disposed of in the burial trenches, or therefore, in the Site Sanitary Landfill cell.

The site's diligence and ability to account for nuclear materials and the ability to trace accidental events is illustrated by the following account provided by the "History of Area B" report, pages 13-14.

"Although the waste streams from the plant processing operations were separated into radioactive and non-radioactive streams, radioactive waste was, in one documented case, accidentally sent to Area B. In that incident during 1958 or 1959, some low-level radioactive waste contaminated with plutonium-239 was sent out of the building in the white waste cans and burned in Area B. Normally, the low-level waste (for example, gloves and other disposable items) was shipped offsite. The error was discovered, and the contaminated soils and burned materials in Area B were removed and disposed of as radioactive wastes."

The History of Area B" report, page 16, also makes the following reference:

"Other than dredged materials from the former flow channel that may have been mixed with other general soil materials, no known radioactive materials were included in construction of either the interior or the cover of the new site sanitary landfill."

The reference to dredged material is contained in another section of the site history document. From 1971 to 1976, low-level radioactive sediments from the former flow monitoring station were disposed of within the OU-1 area. The total volume disposed, the actual site of the disposal and the final disposition of the wastes are not known from the available records. However, it is unlikely that the sediments are now in the Site Sanitary Landfill (despite the possibility raised in the History of Area B report), for several reasons:

- All wastes were screened during construction of the Site Sanitary Landfill and would have identified any low-level wastes. Only one sample detected radioactive contamination, which was taken off-property for disposal. This removal is cited below.

"The entire overflow pond project was monitored by Mound Plant health physicists. Only a small bucket (<5 gallons) of soil with an elevated plutonium level above 100 pCi/g was removed from the overflow pond area (History of Area B, page 16)

- It is unlikely that the sediments were disposed of directly in the burial trench cells. They are more likely to have been disposed of in the Historic Waste Disposal Area, and not placed into the trenches since the materials are sediments, and not readily identifiable trash. If so, these wastes are likely to still be present in the Historic Waste Disposal Area beneath the Site Sanitary Landfill.

- In 1972 and 1973, before construction of the Site Sanitary Landfill, some wastes from the Historic Waste Disposal Area were moved to the ravine located east of the former site of the fire station, and used as fill for a parking lot (PRS-66). During the exhumation of PRS-66, elevated levels of plutonium were found, which could have been, in part, the referenced dredged materials.

Additional support for the absence of radioactive wastes in the Site Sanitary Landfill can be obtained from the results of environmental investigations carried out within OU-1. Locations of buried radioactive materials (Dayton Unit wastes, thorium drums and polonium sands) are known from the site history and from environmental investigations and remedial activities. Due to the potential for radioactive contaminants within OU-1, all samples and cuttings from test borings completed as part of environmental investigations have been screened for radiation. These investigation and confirmation samples, collected from beyond the limits of known radioactive waste disposal, have contained either no detectable radiation, or radiation levels well below the risk-based cleanup standards established for the Mound facility, according to Paul Lucas, DOE Site Manager for the Mound Remediation Project.

In 2005 and 2006, when portions of the thorium drum wastes were removed, confirmation samples from the floor and sidewalls of the excavation were collected and analyzed. In areas where the thorium drum wastes were known to remain (based on site history), elevated levels of radioactivity were detected. However, in other areas of the excavation, where site history suggested that no radioactive wastes had been present, the confirmation sampling showed that there was either no detectable radiation, or radiation levels well below the risk-based cleanup standards established for the Mound facility.

Down-hole gamma logging was performed in 2004 in most of the soil vapor extraction wells, through the sanitary landfill berm, and into the underlying Historic Waste Disposal Area, as part of investigations prior to the partial removal of the thorium drums. The gamma logging is sensitive enough to detect differences in natural radiation levels between different types of natural sediments. No elevated gamma counts were found at elevations within the sanitary landfill berm, or in the uppermost several feet of materials within the historic wastes.

4. Didn't the Tech Team Report from 2004 say that the Site Sanitary Landfill contains the same types of wastes as those found in the historic waste disposal area?

Response: Yes, the Tech Team Report made that statement. This position was based upon the uncertainties identified in the report, the absence of any additional data, and the belief that historic landfill waste was excavated and placed in the sanitary landfill during construction.

In late 2003, the OU-1 Tech Team reviewed the known environmental conditions in the OU-1 area and evaluated uncertainties in site conditions, technology performance, and regulatory requirements. In their final report, dated June 2004, the team developed recommendations/options on how best to address those uncertainties. As a result of this evaluation, the Site Sanitary Landfill and cap (identified in the report as PRS-8 and PRS-9) as well as specific sites within the historic landfill were reclassified from areas where no further assessment was needed, to areas where additional assessment was warranted. No additional investigations have been carried out within this area since that time, with the exception of evaluations of

ground-water contamination issues. The report does not include a complete summary of OU-1 disposal history, nor does it include a complete record of environmental investigation results. Instead, it focuses almost exclusively on uncertainties and questions.

As part of the Conceptual Site Model for OU-1, the Tech Team described the contents of the Site Sanitary Landfill as follows:

"The Site Sanitary Landfill (PRS 8) is expected to have similar contaminants as the Historic Landfill (PRS 10), in part because much of the historic landfill was excavated and placed in the Sanitary Landfill during construction. Specific contamination for these two landfills is unknown, but expected and/or potential contaminants include trichloroethylene (TCE), dichloroethylene (DCE), polychlorinated biphenyls (PCBs), waste oils, benzene, beryllium, mercury, alcohol, acetone, gold, chromium, nickel, copper, cyanide, silver, antifreeze, lead, acid, lithium, paint, solvents, sediment from plant drainage ditch (Pu-238, ZnCrO₄, Th-232, and U-238), bioassay samples, and scintillation cocktails."

"The Site Sanitary Landfill cap (PRS 9), which consists of a minimum of 3 ft of low-permeability clay, was designed to minimize infiltration of precipitation and snowmelt into the landfill and its subsequent flow through contaminated soils and debris, thereby reducing leachate generation. In addition, the cover prevents direct contact with potentially contaminated surface soils and controls contaminant migration by air, surface water, and sediment pathways. There is a possibility that sediments containing low-level plutonium contamination dredged from the old Parshall flume on the lower reach of the plant drainage ditch and placed in the Site Sanitary Landfill were also randomly incorporated into the Site Sanitary Landfill cap during construction. The report of the installation assessment included information that sanitary sludge was used as cover material, but this claim cannot be substantiated. Trash consisting of burned and unburned debris mixed with surrounding soil excavated from other portions of the historic disposal area, was compacted into the liner in 1-ft lifts."

As documented in this paper, these interpretations and positions can be questioned in several respects:

- The vast majority of the historic landfill waste materials is not likely to have been excavated and placed in the Site Sanitary Landfill. Wastes from the disposal trenches, which were used between 1971 and 1976, were relocated into the Site Sanitary Landfill, but the older wastes were left in place. Landfill plans show that the volume of wastes and soil excavated from the burial trench areas closely matches the volume of wastes cocooned within the Site Sanitary Landfill.
- While liquid wastes were either disposed of within the historic landfill, either by being burned or by being dumped out on the ground, these wastes were NOT disposed of within

the burial trenches. Following the ban on open dumping in 1969, all liquid wastes were collected and transported off the site for treatment and disposal. Therefore, the Site Sanitary Landfill should not contain elevated concentrations of the chlorinated solvents, waste oils, associated PCBs, non-chlorinated solvents or paints.

- While low-level radioactive wastes in sediments from the plant drainage ditch may have been disposed of within the historic landfill, there is no proof that they were ever disposed of within the waste disposal trenches or ultimately, within the Site Sanitary Landfill.

Summary

Site waste disposal practices changed and improved over time at Mound. By the mid-1950's, radioactive wastes were segregated from non-radioactive wastes, and were disposed of off-site.

Wastes generated after the 1969 Clean Air Act were segregated with hazardous and all radioactive materials removed from the site. The excavation of the burial trenches in 1970 established a place for Mound to dispose of their sanitary and office wastes.

The plutonium incident of 1969 established the vulnerability of the community to a waste spill. The DOE response to this was the creation of the Overflow Pond to capture contaminants before they migrated off site. In executing the plan for the pond, DOE took the opportunity to construct a landfill cell for the trash that had accumulated in the trenches since 1970. The implementation of the plan was carefully undertaken to ensure that radioactive materials in the Historic Waste Disposal Area remained segregated from the sanitary waste. Unfortunately, in executing the sanitary landfill plan, the Department chose to leave today's wastes of greatest concern in the Historic Waste Disposal Area in place.

When the Site Sanitary Landfill was constructed, only the sanitary wastes removed from the burial trenches and the native soils surrounding the trenches were disposed of within the landfill cell. While wastes were being transferred into the Site Sanitary Landfill, they were screened for plutonium at levels above the screening level in place at that time. The very small volume of wastes so identified (less than 5 gallons) was removed and disposed of offsite.

Environmental investigations and remediation carried out within OU-1 to date have been focused on wastes contained within the Historic Waste Disposal Area. Nevertheless, the sampling carried out to date shows that the Site Sanitary Landfill and the berm surrounding it do not contain elevated levels of contaminants, and screening of the cuttings shows that radioactive wastes have not been detected in areas beyond those where waste disposal was known to have taken place.

The 2004 Savannah River National Laboratories study of ground water beneath OU-1 analyzed for gases (carbon dioxide, oxygen and methane, as well as volatile organic compounds). These estimated detections are just slightly over the method detection limits, and are well below the practical quantification limits. They are also several orders of magnitude below the values for soil gas samples collected from marginal areas of the Historic Waste Disposal Area. These results support the conclusion from the site history that significant amounts of volatile organic compounds were not disposed of within the waste disposal trenches or the Site Sanitary Landfill.

Soil samples were collected from the test borings in which the air sparge wells were installed. These wells were completed through the berm surrounding the Site Sanitary Landfill, and not through the

wastes themselves. No volatile organic compounds were detected in over half of the samples collected. Only trace levels were found in the other samples

Conclusions

The OU-1 Project Team believes it is unlikely that radioactive or hazardous wastes will be found in the Site Sanitary Landfill because:

- The plans and construction of the Site Sanitary Landfill indicate that the material to be placed in the cell was taken from the 1971 to 1976 burial trenches, which was considered sanitary waste.
- The burial trenches were newly constructed in virgin soils eliminating the potential of waste existing in the area prior to the sanitary waste.
- The construction plans show that the material within the Historic Waste Disposal Area **was not** to be included in the sanitary cell.
- Liquid hazardous waste segregation practices were in place starting in 1969, so these wastes would never have been placed in the burial trenches.
- Radioactive waste segregation practices were in place from at least before 1959, so these wastes would never have been placed in the burial trenches.
- Radiation sampling was conducted on the waste from the burial trenches during the construction of the sanitary landfill, and no contamination above the then-existent screening level was disposed of in the landfill.
- All soil and soil gas samples from the sanitary landfill indicate that only trace concentrations of VOC's are present.

While some uncertainty exists with regard to the waste in the sanitary landfill, which warrants additional sampling, there is little information to support a conclusion that these wastes contain radioactive or hazardous waste materials prohibited in a licensed Ohio Subtitle D solid waste facility.

If the decision is made to remove the Site Sanitary Landfill as part of further remedial actions, the wastes from within the landfill will have to be characterized for disposal, in accordance with the waste acceptance criteria for the selected landfill facility. The testing will include the RCRA Hazardous Waste Characterization testing (TCLP analysis), in order to ensure that no wastes are improperly disposed of in a facility not licensed to accept them, adding an additional layer of confidence that materials of concern would be identified. As part of this testing, additional samples can be taken and analyzed for radioactive contaminants, in order to ensure that no radioactive wastes are disposed of in a Subtitle D sanitary landfill.

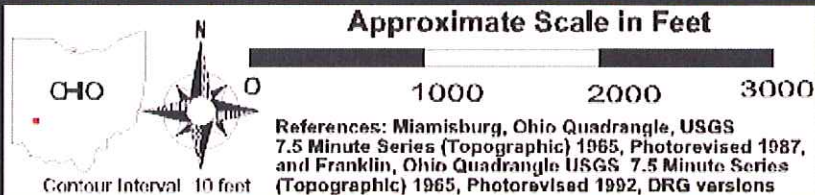
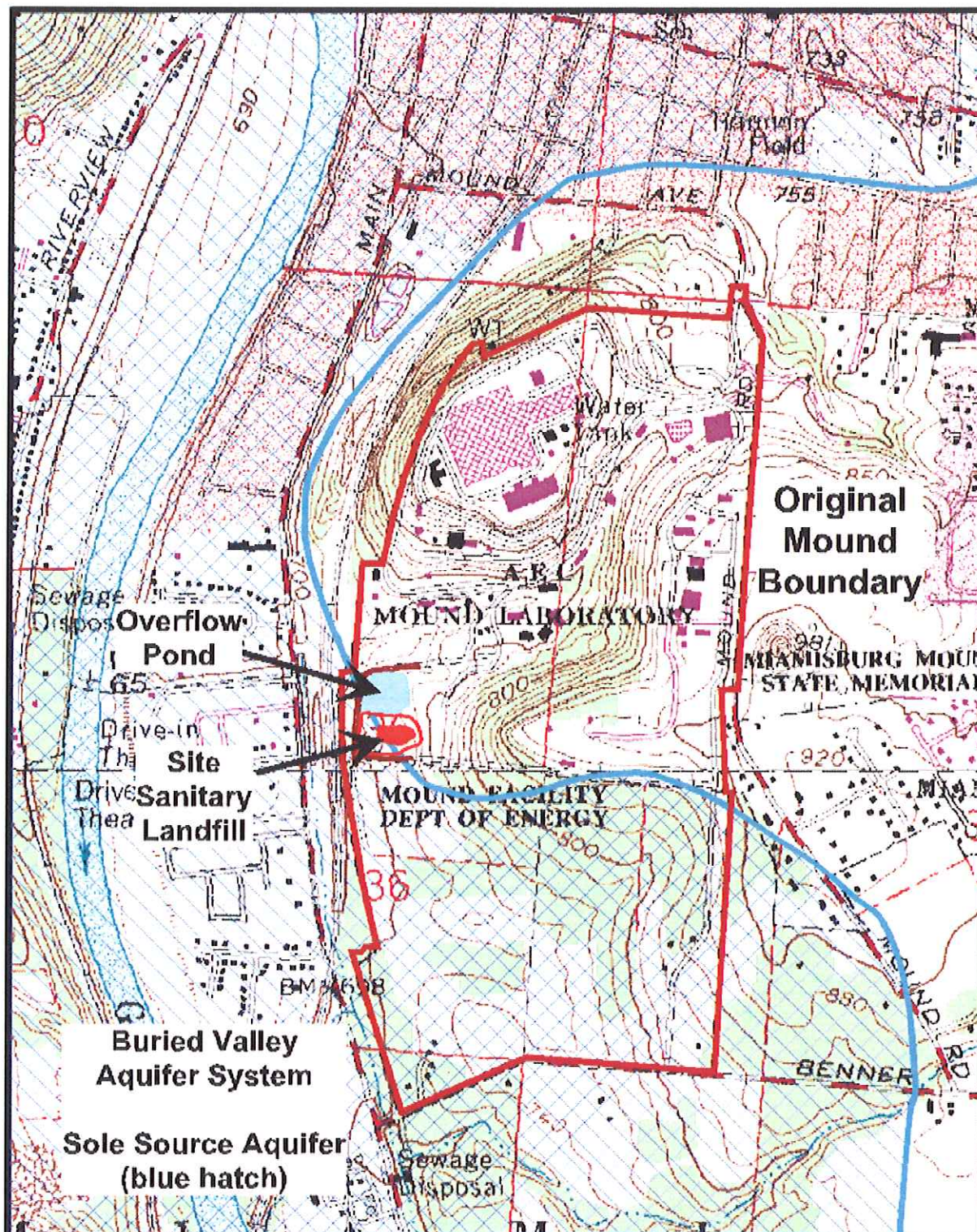
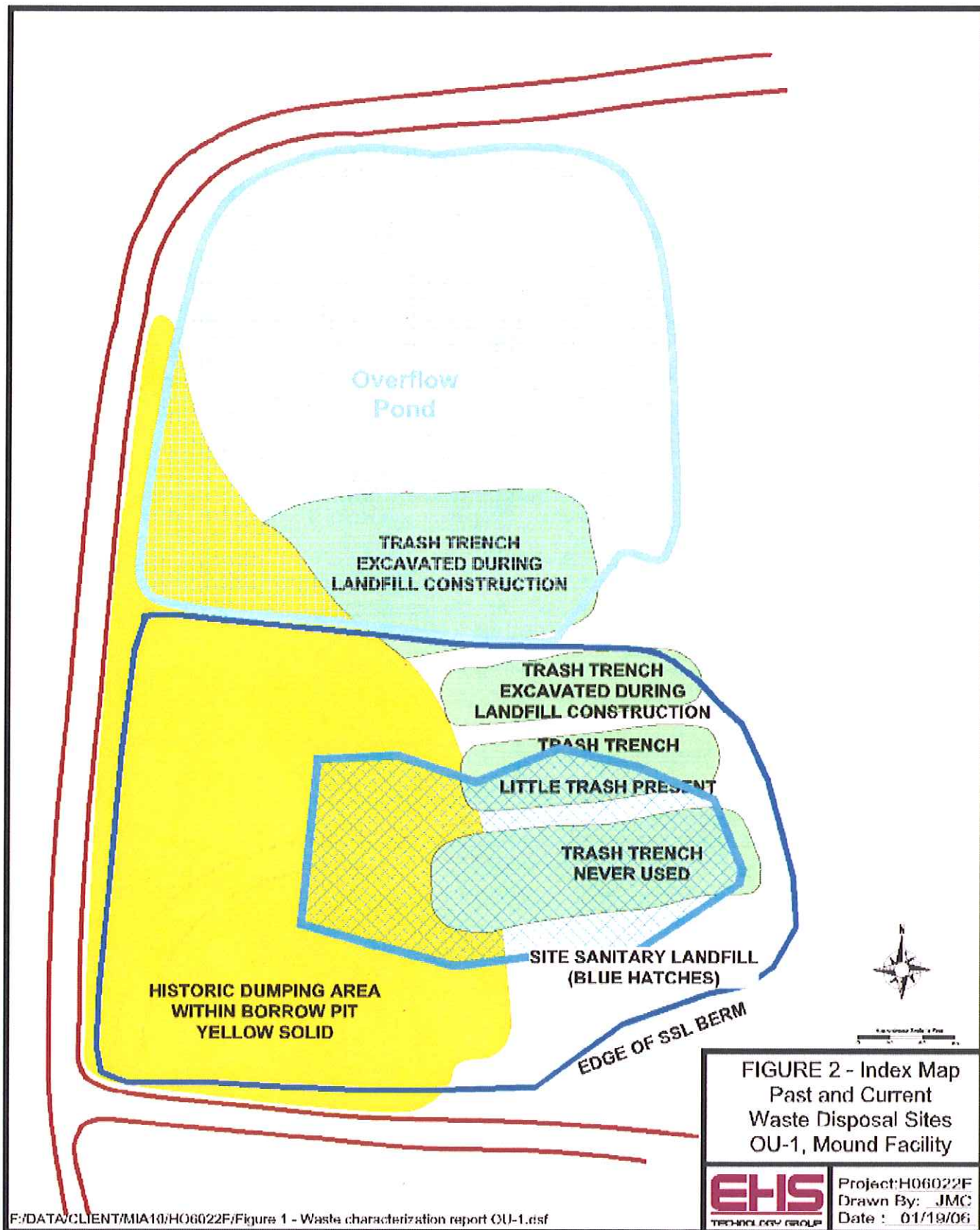


Figure 1- Site Location
DOE Mound Facility and
Sole Source Aquifer

EHS
TECHNOLOGY GROUP

Project: G06022F
Drawn By: JMC
Date: 03/02/06



F:/DATA/CLIENT/MIA10/H06022F/Figure 1 - Waste characterization report OU-1.csf

